

10th
ANNIVERSARY



10th ANNIVERSARY WORLD CONFERENCE

HELSINKI 2019



Scandic Marina Congress Center, Helsinki - 15th - 18th September 2019

President's Foreword

On behalf of the European Federation of Explosives Engineers - EFEE I would like to invite you all to our very special 10th anniversary edition of the World Conference on Explosives and Blasting taking place in Helsinki, Finland, from 15th - 18th September 2019.

Since its launch in 2000 the EFEE World Conference on Explosives and Blasting has established itself as one of the most important international blasting events and continues to grow in both size and reputation. We expect the 10th edition to be as successful as our previous Conferences, attracting participants not only from Europe but also all over the World.

The Conference is organised in cooperation with the Finnish National Association – Infra Contractors Association in Finland (INFRA) which has over 1500 member companies with a combined total revenue exceeding €4,5 billion and over 16,000 employees.

The destination for this year's Conference is the beautiful city of Helsinki, Finland, famed for its high standard of living, outdoor beauty and European economic success. The United Nations World Happiness Report also voted Finland as the happiest country, twice in a row.

Finland is at the forefront of the industry with rock construction projects including top of the art underground leisure and utility facilities like churches, underground parking and service facilities, sports and swimming halls, energy caverns and of course normal subway and other transportation infrastructure. Helsinki was the first and still probably the only capital in the world which has applied an underground general plan in order to secure efficient use of underground space for supporting city infrastructure.

The 10th World Conference on Explosives and Blasting 2019 will take place at Scandic Marina Congress Center a short walk from Helsinki's beautiful city centre. The venue offers unique conference room and halls, is bright, spacious and modern with excellent loading and logistic possibilities which enables a natural flow for the participants. During breaks, participants can enjoy some fresh air out on the terrace or just savour the breath-taking views over the waterfront and of the city centre of Helsinki.

The Conference will start on Sunday 15th September with registration, workshop and welcome reception and will continue on Monday 16th September and Tuesday 17th September with technical sessions and exhibition. The very special Gala Dinner is planned for Monday evening

and will be held on Klippan Island where you will be able to experience excellent food and some of the best views in Helsinki. We are also planning a post conference excursion to a working dynamite and explosives factory for Wednesday 18th September.

The Sunday workshop will be introducing modern, efficient and safe rock construction and blasting works in sensitive urban environment and will hopefully include a visit to underground Helsinki by foot, participants will be taken to a number of non-public underground facilities.

Our large exhibition has grown with each Conference attracting some of the largest names in the explosives and blasting industry. It's an integral part of the conference allowing the demonstration of new technologies and for participants to form global relationships with suppliers.

The Conference has a loyal following and we anticipate over 450 professionals from over 50 different countries. This will allow us to create an engaging and unique forum for meetings and discussions between professionals from tunnelling, construction, demolition, quarry as well as the mining industry. Mutually sharing industry experiences including new technologies, techniques and experiences. Important to us all - explosives end-users, manufactures, drilling and blasting operators, consultants and contractors.

I'm really looking forward to welcoming you all to my home city of Helsinki for this historic 10th anniversary event.

Jari Honkanen

EFEE President



Jari

www.efee2019.com

Technical Committee

Roger Holmberg, Sweden - (Chairman)
Johan Finsteen Gjødvad, Denmark
Ric Hosley, US
Jörg Rennert, Germany
Jouko Salonen, Finland

Conference Committee

Heinz Berger - (Chairman)
Donald Jonson
Doru Anghelache
James Tyler
Jari Honkanen
Johan Finsteen Gjødvad
José Carlos Gois
Roger Holmberg

Registration

Conference registration includes admission to all technical sessions, the exhibition, a copy of the printed proceedings and admission to the welcome drinks reception on Sunday 15 September.

Early Bird Registration

Delegate (Non EFEE Member): € 695.00 (excluding tax)
Student: € 50.00 (excluding tax)
EFEE Members: € 625.00 (excluding tax)
Individual, Company and Associate Members – one discounted registration only.

EFEE National Members: € 555.00 (excluding tax)
National Members are entitled to one discounted registration only.

All participants including speakers are required to pay the registration fee.

To take advantage of our “early bird” registration discount, register online before 31 July:

➤ Register today on-line: www.efee2019.com

For further information please email: info@efee2019.com

Official Languages

The official language of the conference is English.
All technical papers will be presented in English.

Schedule of Events

Sunday 15 September 2019

10.00 – 16.30 Workshop – Blasting works in a sensitive urban environment - Further details are shown at Sunday Workshop*

10.00 – 16.00 Exhibition Set-up –
Scandic Marina Congress Center

12.00 – 18.00 Conference Registration –
Scandic Marina Congress Center

18.00 – 19.30 Welcome Drinks Reception and Opening Speeches
Scandic Marina Congress Center

Monday 16 September 2019

08.00 – 12.00 Conference Registration –
Scandic Marina Congress Center

08.30 – 17.00 Technical Sessions –
Scandic Marina Congress Center

08.30 – 17.00 Exhibition – *Scandic Marina Congress Center*

19.00 till late Gala Dinner – *Klippan Island*

Tuesday 17 September 2019

08.30 – 16.00 Technical Sessions –
Scandic Marina Congress Center

08.30 – 16.00 Exhibition – *Scandic Marina Congress Center*

17.00 Conference Close –
Scandic Marina Congress Center

Wednesday 18 September 2019

07.15 – 17.00 Post Conference Technical Excursion – *Operating Dynamite and Explosives Factory, Hanko* - Further details are shown below**

Sunday Workshop*

This year's workshop begins with a morning presentation of how the Helsinki underground center has been constructed including blasting methods and management of special challenges like geological hazards and environmental impacts. Presentations are followed by a discussion with builders, contractors and consultants.

After lunch there is a unique tour, by foot, of underground Helsinki. Using underground passages, the route will take the group to the heart of the city looking at underground works and facilities. The group then returns to the hotel by tram. Length of the walk approx. 2.5 km with several stops. The workshop and tour will be conducted in English only.

Timings and tickets

10:00 Workshop presentations and discussion

- Benefits and challenges of underground construction, Helsinki underground general plan
- Blasting techniques and processes for sensitive urban areas
- Management of environmental effects of blasting in sensitive urban areas

12:00 Lunch

13:00 Departure from Marina congress center for site visits by foot

- Underground book storage of library of Helsinki University
- Helsinki central service tunnel
- Underground parking and service facilities
- Pedestrian, traffic and energy tunnels

16:00 Return to Scandic Grand Marina by tram

Tickets include: Workshop access, underground tour, hot buffet lunch and refreshments. EFEE Member: €145 + local taxes. EFEE Non-Member: €195 + local taxes.

Post Conference Technical Excursion**

This year we will be providing a post conference excursion to a working dynamite and explosives factory in a beautiful seaside village of Hanko, 130 km west from Helsinki. Here we will take a 2-hour tour explaining the manufacturing process followed by lunch. The excursion returns through the small mining town of Lohja, built around the oldest operating mine in Finland where we will visit the Tytyri Mine Experience.

<https://www.efee2019.com/programme/post-conference-technical-excursion/>

Timings and tickets

07:15 Departure from Scandic Grand Marina by coach

09:00 Coffee, 125 years of explosives manufacturing, Forcit group

09:30 Factory tours

11:30 Lunch

12:30 Departure from Forcit

13:30 Visit to Tytyri underground mining museum & experience, including coffee

15:45 Departure from Lohja

17:00 Return to Scandic Grand Marina

Tickets include: Coach transfers, hot buffet lunch and refreshments, guided tours around the explosives factory and underground mine experience. EFEE Member: €145 + local taxes. EFEE Non-Member: €195 + local taxes.

Rates

| | Item | Amount |
|--|--|---------|
| Early Bird Discount Registration before 31 July 2019 | Early Bird Conference registration for NON EFEE Members | €695.00 |
| | Early Bird Conference registration for EFEE Members (individual/corporate) and those applying for EFEE Membership | €625.00 |
| | Early Bird Conference registration for Students | €50.00 |
| | Early Bird Conference registration for EFEE National Members (one discounted registration, per membership) | €555.00 |
| Registration from 1 August 2019 | Conference registration for NON EFEE Members | €800.00 |
| | Conference registration for EFEE Members (individual/corporate) and those applying for EFEE Membership | €720.00 |
| | Conference registration for Students | €50.00 |
| | Conference registration for EFEE National Members (one discounted registration, per membership) | €640.00 |
| Gala Dinner | Gala Dinner tickets include half a bottle of wine per person and entertainment | €115.00 |
| Welcome Drinks Reception | Additional tickets to the Welcome Drinks Reception | €30.00 |
| Proceedings | Printed Proceedings | €75.00 |
| | USB Proceedings | €60.00 |
| Sunday Workshop | Tickets for NON EFEE Members | €195.00 |
| | Tickets for EFEE Members | €145.00 |
| Post Conference Excursion | Tickets for NON EFEE Members | €195.00 |
| | Tickets for EFEE Members | €145.00 |
| EFEE Membership | One year individual membership | €75.00 |
| The above rates exclude local taxes (typically 24%) | | |

Booking Information

EFEE Members

EFEE members qualify for a discounted conference registration package. The cost to become an EFEE member is just €75.00 for professionals and €25.00 for students (excluding tax). EFEE membership can be purchased during the registration process which will immediately allow you to take advantage of the discounted rates.

EFEE Corporate Members

If your organisation is an EFEE Corporate Member the company qualifies for one discounted delegate registration. Any further bookings must be completed at the standard member registration rate.

EFEE National Members

EFEE National Members also qualify for one discounted delegate registration. Any further bookings must be completed at the standard member registration rate.

Students

Take advantage of our competitive student registration packages. Your Student reference number will be required during the registration process.

EFEE Membership – Join EFEE to take advantage of the discounted conference rate. Membership is available to purchase during the registration process.

Register before 31st July to take advantage of our early bird offers.

Book online today: www.efee2019.com

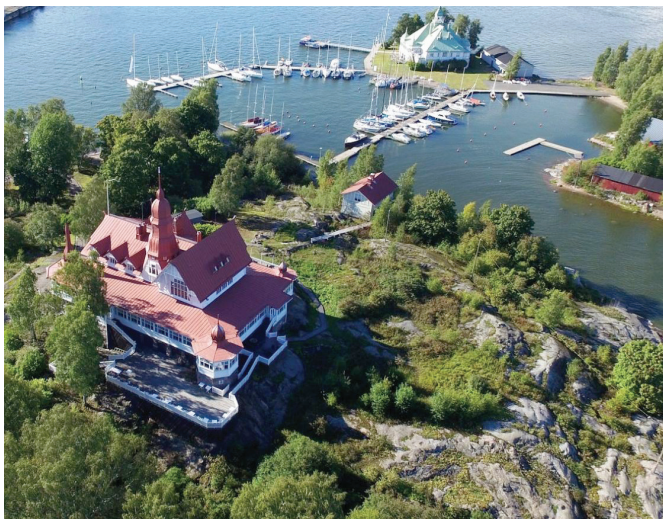
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Exhibitors

The conference includes a large 1000 metre squared exhibition. The exhibition will display and demonstrate the latest developments across the industry. Areas covered include explosives, consultants, suppliers and manufacturers. All lunches and coffee breaks will be served around the exhibition hall.

To view the latest list of exhibitors and for further information surrounding the exhibition and sponsorship please visit: www.efee2019.com/exhibition-sponsorship/

Venue Information

The 2019 EFEE conference will take place at the **Scandic Marina Congress Center**, a short walk from Helsinki's beautiful city centre overlooking the waterfront as well as islands of Valkosaari and Luoto.

The Scandic Marina Congress Center is in close proximity to public transport making it easy to explore the capital. High speed internet access is available throughout the venue.

For further information please visit: www.marinacongresscenter.com

Accommodation

Accommodation has been secured for the nights of the 12th through to 18th September at the **Scandic Grand Marina**, Helsinki. Housed in a 1920s Art Nouveau building, facilities include free WiFi, sauna, gym and a 24-hour on-site shop. Their street food themed restaurant has an international atmosphere and serves fresh, local cuisine.

The hotel is directly opposite the conference venue by the waterfront of Katajanokka and is a short, 5-minute walk from the Market Square. Bookings can be made by following the link below. We would encourage you to secure your room as soon as possible as availability is limited. <https://www.scandichotels.com/grandmarina?bookingcode=BEFE120919>

Welcome Drinks Reception

The welcome drinks reception marks the opening of the conference and will take place on the evening of Sunday 15 September from 6pm at **Scandic Marina Congress Center** in Helsinki. The cost of attending is included in the registration fee. Additional tickets can be purchased for partners at € 30 (excluding tax).

Gala Dinner

Experience excellent food and some of the best views in Helsinki at our Saarisalo Gala Dinner on Klippan Island.

The best view of Helsinki opens upon arrival by boat. **Restaurant Saarisalo**, a White Art Nouveau style villa built in 1898, is located on Klippan island in front of South Harbour and offers a superb view and atmosphere. You can admire the Helsinki skyline to the north, the walls and bastions of the Suomenlinna fortress to the south.

The evening consists of a luxurious Finnish menu paired with matching wines and evening entertainment by Finnish Magician, Noora Karma, an internationally renowned and award-winning magician, mentalist and mentor. Noora Karma won the Finnish Championships in 2005 and has had numerous appearances on TV channels and radio programs, as well as extensive media and social media interest. Noora has performed for many international celebrities including UK and UAE royal families, on her own prime-time TV shows, amongst other TV series including: Masters of Illusion (USA), The Survivor and Dancing with the Stars and made magic a fashionable phenomenon attracting a younger audience to the world of magic. The evening will conclude with a fireworks display and live music.

Entry includes:

Boat transfers, welcome drink, 3 course meal, wine, coffee, fireworks display, entertainment and live music.

The cost to participate is €115 (excluding tax).

Tickets are available to purchase through the registration process.

Activities

Allas Sea Pool

Allas Sea Pool is a garden-like oasis in the heart of Helsinki, next to the Grand Marina. The centre has a large pool area, magnificent saunas and good food. Spending a day at Allas means relaxing and enjoying the experience with all of your senses. Nestled in the middle of Helsinki, next to the Market square, here to be enjoyed every day of the year.

www.allasseapool.fi/en/

Design District Helsinki

Design District Helsinki brings together creative people in the heart of Helsinki. The district covers Punavuori, Kaartinkaupunki, Kamppi and Ullanlinna and is an area full of design and antique shops, fashion stores, museums, art galleries, restaurants and showrooms. In the area you'll also find the Museum of Finnish Architecture and the Design Museum. Information can be found on the webpages or on a map published by the Design District Helsinki.

www.designdistrict.fi/en/

Market Square

Located at the South Harbour at one end of the Esplanade Park, the Market Square is Helsinki's most international and famous market. The booths here sell traditional market foods and treats, as well as handicrafts and souvenirs. There are also heated café tents where you can comfortably have a steaming hot coffee even on the coldest days in winter.

www.hel.fi/helsinki/en/culture/city-culture/markets/

SkyWheel Helsinki

SkyWheel Helsinki, located in Katajanokka, is a 40-meter high observation wheel that provides a 360° view of Helsinki and its most important surrounding attractions. Possible to also book a VIP-gondola with Champagne or sauna-gondola.

www.skywheel.fi/en/



Suomenlinna Sea Fortress

A Unesco World Heritage Site, Suomenlinna sea fortress is one of the most popular attractions in Finland for a reason. Suomenlinna was shaped by three historic eras when it helped to defend first Sweden, then Russia and ultimately Finland. With its museums, events and restaurants Suomenlinna offers a unique experience for visitors of all ages.

www.suomenlinna.fi/en



Travel by Air

Helsinki-Vantaa Airport is the main international airport of the Helsinki metropolitan region. www.finavia.fi/en/helsinki-airport/

Onward journey to Helsinki City Centre

There are several ways to transfer from the airport to Helsinki City Centre, please visit www.finavia.fi/en/airports/helsinki-airport/parking-access/trains for further information.

Flight journey lengths:

- 2 hours 50 minutes from Paris
- 2 hours 50 minutes from London
- 8 hours from New York

Further flight information please visit:
www.skyscanner.net

Travel by Public Transport

Public transport is relatively inexpensive, covers most of the city and useful for negotiating the city's islands and historical sites.



Helsinki Information

Helsinki is Finland's capital city and the centre of its culture, media and business.

The archipelago of Helsinki consists of 330 islands and is officially 2/3 Baltic Sea and 1/3 land mass.

The city is famous for design and world-renowned modern design heritage can be seen everywhere in the city. Famous brands like Marimekko, Iittala, Artek and Arabia are a part of everyday life.

The city is covered in green areas with lots of possibilities to enjoy outdoor activities and relaxation. The large Central Park and its forest spread just beyond the city centre, which is compact and easily explored on foot.

Helsinki has a thriving blasting industry of which we will be taking full advantage during the conference programme.

Helsinki is the first city in the world to have an underground general plan and a lot of essential infrastructure is built underground in order to reduce traffic and free space for more important use at the surface.

For further information please visit
www.visitfinland.com/helsinki/

Technical Papers

A range of abstracts have been submitted to our technical committee for approval including:

Blast Vibration and Seismology

- Quantification of damage caused by blast vibrations at medium frequencies
- Surface blast vibration regression model for underground mines
- A comparative study of the geophone recordings between confined and free face blasts
- Holistic analysis of the influence of vibration-optimized blasting patterns on the performance of a hard rock mine
- Analysis of ground variation and airblast on processing plant and community, at gold mining, PT. Agincourt Resources, Tapanuli Selatan, North Sumatera, Indonesia
- Research on the seismic effects of blasting works and their influence on the environment according to valid Czech regulations
- Development of effective blasting limitations using direct stress monitoring of operating pipelines
- Importance of structural strain for blast vibration control
- Vibration monitoring standards connected to the use of explosives in Europe
- Vibration monitoring using inhouse developed device: An electronic approach
- Abstract of air decking device

Blasting Work Experiences

- Digitalization for optimization: easier and cheaper
- Relevant good practice for explosive blowdowns of civil and nuclear structures
- Mine-to-Mill optimisation in Sarcheshmeh copper mine, Kerman, Iran
- Application of measurement while drilling to assess chargeability in sublevel caving operations
- Analysis of the potential causes of finer fragmentation of blasted ore
- Complex hydro-electric powerhouse foundation made more difficult
- Drill and blast-based excavation process used in nuclear disposal facility ONKALO® construction
- Joints mapping with commercial monitoring tools: Techniques, results and lessons
- Wireless blasting in Europe
- Controlling blast vibrations in close Proximity to a Railroad Bridge
- Cross-hole seismic measurement of blast induced rock mass quality change: A review
- Blasting operations in furnaces, smelter ovens and different parts of processes at steel works

EU Directives and Harmonisation Work

- Track and Trace in Europe and worldwide, the beginning, the present and in the future
- New standardisation tasks under the European Explosives Directive: Electronic detonators, on-site mixed explosives

Health, Safety and Environment

- To detect unexposed explosives at ground structure
- Bringing comprehensive environmental monitoring to blasting projects: turning fear to trust
- Broadband noise from empty and loaded coal trains

Blast Design Management

- Intelligent design software for open bench blasting
- Numerical study of the impact of joints on rock fragmentation by blasting
- Optimising blast layouts by aerial imagery and automatic placement of boreholes
- Wall control blasting - Design and analysis
- The development of pressure to Young's modulus models for precision presplit blasting
- The complete diagnostic program for underground stope blasting to optimize dilution
- Influence of the loading and support conditions on the ultimate capacity of columns to resist the effects of near - field explosions
- SPH modeling of burden movement: calibration from high-speed video recordings

New Applications and Training

- Rock fragmentation classification using machine learning methods
- Innovative method to determine velocity of detonation by measuring electromagnetic pulse (EMP)

Technical Development

- The relationship between fragmentation efficiency and the shape of linear explosive charges
- A new tool for hole deviation control - A statistical analysis
- New technology to understand the link between cracking and vibrations
- Benchmarking the performance of a bulk water-gel explosive using state of art techniques
- Verification optimal millisecond timing delay of blasting in quarries with electronic detonators
- The ideal detonation behaviour of a void-sensitised, non-ideal explosives
- Development of a material flow model from bench to mill in Aitik open pit mine, Sweden
- A combined wire-wireless blasting system, the next generation of electronic detonators
- Development of nitrogen free environmentally friendly blasting explosive
- Shock front curvature measurements of emulsion explosives
- Aquarium tests to study the detonation behaviour of a non-ideal explosives

Post Conference Workshop – 19th – 20th September 2019

INTERNATIONAL ADVANCED WALL CONTROL BLASTING SHORT COURSE



Workshop Details

International Advanced Wall Control Blasting Short Course

Workshop Presenters:

Dr Dane P Blair (DPB) and Trevor N Little (TNL) [Facilitator]

Workshop Convenors:

Blasting Geomechanics Pty Ltd

Workshop Dates:

Thursday 19th and Friday 20th September 2019

(Time 8.30 am - 4.30 pm)

Workshop Venue:

Scandic Marina Congress Center, Helsinki, Finland

Workshop Fees:

(Includes: all day coffee, lunch, morning tea, afternoon tea, and 200 page course manual)

AUD\$1500 (approx. 950 €) for two days, or

AUD\$800 (approx. 500 €) for single day attendance, or

AUD\$750 (approx. 475 €) for two days for F/T students.

Payment can be made using - Visa or Mastercard, PayPal, money transfer or purchase order [excludes VAT].

Contact details: Workshop Administrator

Cherie Little

Phone +61 8 92340650

Mob +61 400924306,

Web: www.bgpl.com.auEmail: mail@bgpl.com.au

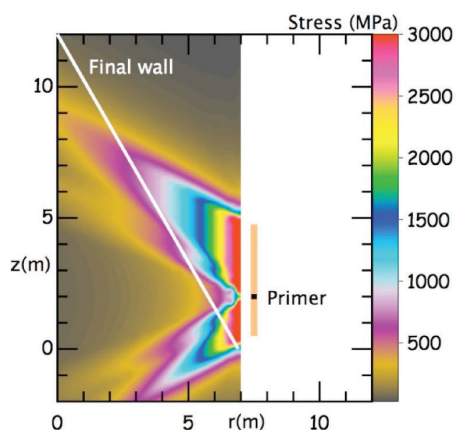
Workshop Program

Day 1 Thursday 19th September 2019

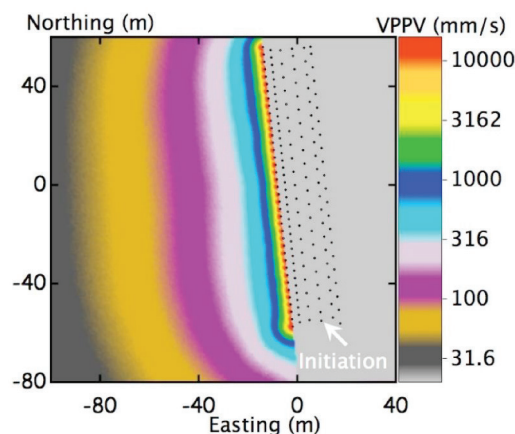
| | |
|----------|---|
| 8.30 am | Topic 1 Course introduction and context (TNL) |
| 9.30 am | Topic 2 Slope instability and controls [Slope engineering for Blasters] (TNL) |
| 10.30 am | Morning Tea (30 minutes) |
| 11.00 am | Topic 4A Blast damage: causes/ mechanisms (DPB) |
| 12.30 pm | Lunch (45 minutes) |
| 1.15 pm | Topic 4A Continued (DPB) |
| 1.45 pm | Topic 3 Techniques for wall control blasting (TNL) |
| 2.30 pm | Topic 5 Measurement for wall control (DPB) |
| 4.30 pm | Close for Day 1 |

Day 2 Friday 20th September 2019

| | |
|------------|---|
| 8.30 am | Topic 4B Physical nature of rock damage due to blasting (TNL) |
| 9.30 am | Topic 6 Modelling for wall control (DPB) |
| 10.30 am | Morning Tea (30 minutes) |
| 11.00 am | Topic 6 Continued |
| 12.00 noon | Topic 7 Controlling the wall response (DPB) |
| 12.30 pm | Lunch (45 minutes) |
| 1.15 pm | Topic 7 Continued |
| 2.45 pm | Topic 8 Blast design and management (TNL) |
| 3.45 pm | Topic 9 Takeaways (TNL) + Open discussion (All) |
| 4.25 pm | Evaluation and Close of Workshop. |



Dynamic stress radiation from a single blasthole
(Analytical Damage Model)



VPPV radiation from a full-scale blast
(Monte Carlo Waveform Superposition Model)